Connecticut CTE

Automotive Technology (Grades 9-12)

Automotive Technology

A Automotive Technology AUTO

1 Students demonstrate the value and necessity of practicing personal and occupational safety and protecting the environment by using materials and processes in accordance with manufacturer and industry standards. AUTO.01

a List and explain common environmental conservation practices and their applications. AUTO.01.01

b Demonstrate knowledge of proper use, storage, and disposal of hazardous materials for an automotive facility according to OSHA regulations.* (B4) AUTO.01.02

c Explain the way in which waste gasses, emissions, and other environmentally destructive substances are generated and their effects on the environment. AUTO.01.03

d Describe a safe working environment for both employees and the shop environment. AUTO.01.04

e Demonstrate and explain knowledge of personal safety practices such as eyewear, clothing, footwear, and personal protective equipment (PPE).* (B5) AUTO.01.05

f Demonstrate and explain knowledge of shop safety procedures when performing tasks, such as raising a vehicle with a floor jack.*(B6) AUTO.01.06

g Identify basic hand tools and their usage in the automotive industry.* (B7) AUTO.01.07

2 Customer Relations and Shop Procedures: Explain the basic processes and procedures for maintaining a clean, safe and customer-friendly shop. AUTO.02

a Interpret repair and work orders including differentiating between parts and labor cost.*(A1) AUTO.02.01

b Differentiate between flat rate labor and hourly labor.*(A2) AUTO.02.02

c Explain what is included in an automobile maintenance schedule.* (A3) AUTO.02.03

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3 Explain scientific principles in relation to chemical, mechanical, and physical functions for various engine and vehicle systems. AUTO.03

- a Demonstrate the operating principles of internal and external combustion engines AUTO.03.01
- b Describe basic valve train operation and configuration, such as DOHC, SOHC, OHV, and flathead.*(C8) AUTO.03.02
- c Describe basic engine cylinder configurations such as V, inline, and horizontally opposed.*(C9) AUTO.03.03
- d Identify and describe the function of the basic engine components.* (C10) AUTO.03.04
- e Describe principles of pneumatic and hydraulic power and their applications. AUTO.03.05
- f Describe the purpose, operation, and basic components of lubrication systems.* (C13) AUTO.03.06A
- g Describe the purpose, operation, and basic components of engine cooling systems.*(C14) AUTO.03.06B
- h Illustrate principles of electricity, electronics and electrical power generation, and distribution systems. AUTO.03.07
- i Differentiate between the 4-stroke and 2-stroke operating cycles.* (C11) AUTO.03.08
- j Differentiate between spark ignition and compression ignition engines.* (C12) AUTO.03.09
- k Perform necessary procedures to maintain, diagnose, service, and repair vehicle systems and malfunctions. AUTO.03.10

4 Perform and document maintenance procedures in accordance with the recommendations of the manufacturer. AUTO.04

- a Follow the procedures and practices of various manufacturers regarding repair and maintenance schedules. AUTO.04.01
- b Demonstrate how to properly document maintenance procedures in accordance with applicable rules, laws, and regulations. AUTO.04.02
- c Use reference books, technical service bulletins, and other documents and materials related to the automotive service industry available in print and through electronic retrieval systems to accurately diagnose and repair vehicles. AUTO.04.03
- d Evaluate the advantages and disadvantages of existing, new, and emerging systems and the effects of those systems on the environment. AUTO.04.04
- e Complete a work order, including customer information, description of repairs, and billing information, in accordance with applicable rules, laws, and regulations. AUTO.04.05

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5 Diagnosis and repair engines, including but not limited to two- and four-stroke and supporting subsystems AUTO.05

- a Perform general engine maintenance, diagnosis, service, and repair in accordance with portable national industry standards. AUTO.05.01
- b Maintain, diagnose, service, and repair lubrication and cooling systems. AUTO.05.02
- c Maintain, diagnose, and repair computerized engine control systems and other engine-related systems. AUTO.05.03
- d Describe and demonstrate the process for performing exhaust inspection and service. AUTO.05.04

6 Demonstrate the function, principles, and operation of electrical and electronic systems using manufacturer and industry standards. AUTO.06

- a Maintain, diagnose, and repair electrical systems. AUTO.06.01
- b Explain the process for performing battery diagnosis and service.* (D16) AUTO.06.02
- c Describe the purpose, operation, and components of basic starting systems.* (D17) AUTO.06.03
- d Describe the purpose, operation, and components of basic charging systems.* (D18) AUTO.06.04
- e Describe the purpose, operation, and components of basic lighting systems.* (D19) AUTO.06.05
- f Differentiate between series and parallel circuits.*(D20) AUTO.06.06
- g Define volts, amperes, and resistance.*(D21) AUTO.06.07
- h Perform simple calculations for volts, amperes, and resistance using Ohm's Law.* (D22) AUTO.06.08

7 Engine Performance: Describe the components and functions of the various systems that are related to engine performance. AUTO.07

- a Describe the purpose, operation, and basic components of the ignition system.* (E23) AUTO.07.01
- b Describe the purpose, operation, and basic components of fuel and air induction systems.*(E24) AUTO.07.02
- c Describe the purpose, operation, and basic components of exhaust and exhaust emissions systems.*(C15) AUTO.07.03
- d Explain the use of a computer scanner to read Diagnostic Trouble Codes (DTC).* (E27) AUTO.07.04
- e Identify the differences between carburetion and fuel injection.* (E25) AUTO.07.05
- f Describe the purpose, operation, and basic components of evaporative emission control systems.*(E26) AUTO.07.06

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8 Suspension and Steering: Identify and describe the function of the components that make up suspension and steering systems. AUTO.08

a Describe the purpose, operation, and basic components of the steering system.* (F28) AUTO.08.01

b Describe the purpose, operation, and basic components of the suspension system.*(F29) AUTO.08.02

c Explain caster, camber, and toe-in wheel alignment angles.*(F30) AUTO.08.03

d Identify factors that cause abnormal tire wear.*(E31) AUTO.08.04

9 Demonstrate function and principles of automotive drivetrain, steering and suspension, brake, and tire and wheel components and systems in accordance with portable national industry standards. AUTO.09

a Explain hydraulic systems as they pertain to the service braking systems.* (G32) AUTO.09.01

b Describe the purpose, operation, and basic components of drum brakes.* (G33) AUTO.09.02

c Describe the purpose, operation, and basic components of disc brakes.* (G34) AUTO.09.03

d Describe the components of power assist braking systems. AUTO.09.04

e Describe the purpose, operation, and basic components of parking brake systems.*(G35) AUTO.09.05

f Describe the purpose, operation, and basic components of anti-lock braking systems (ABS) and traction control systems (TCS).*(G36) AUTO.09.06

g Describe the function and operation of automatic and manual transmissions and transaxles. AUTO.09.07

h Select appropriate wheels and tires for vehicles. AUTO.09.08

i Maintain, diagnose, service, and repair under-vehicle systems and malfunctions. AUTO.09.09

10 Explain collision repair scientific principles in relation to chemical, mechanical, and physical functions and in relation to industry and manufacturer standards AUTO.10

a Diagram principles of mechanical, electrical, hydraulic, and pneumatic power in relation to collision repair and refinishing AUTO.10.01

b Analyze physical and chemical characteristics of metals, plastics, and other materials. AUTO.10.02

c Describe various body and frame construction types. AUTO.10.03

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11 Perform and document collision repair procedures in accordance with manufacturer recommendations and industry standards. AUTO.11

- a Perform collision repairs according to recommended procedures and practices of various manufacturers. AUTO.11.01
- b Use reference books and materials, technical service bulletins, and other related documents to determine repairs and rate of pay. AUTO.11.02
- c Perform frame inspection and repair. AUTO.11.03
- d Demonstrate applications, installations, and removal of fixed and moveable glass and hardware. AUTO.11.04
- e Perform metal welding and cutting. AUTO.11.05
- f Prepare and analyze vehicles for repair. AUTO.11.06
- g Perform outer body panel repairs, replacements, and adjustments. AUTO.11.07
- h Prepare vehicles for metal finishing and body filling. AUTO.11.08

12 Prepare vehicles for metal finishing and body filling. AUTO.12

- a Identify, use, and repair plastics and adhesives AUTO.12.01
- b Prepare surfaces for painting and finishing AUTO.12.02
- d Mix, match, and apply paint. AUTO.12.04
- c Operate of spray guns and related equipment. AUTO.12.03
- e Diagnose causes and apply cures of paint defects. AUTO.12.05
- f Prepare vehicles for final detail. AUTO.12.06